

Getting Big Sagebrush Back on the Range

Sagebrush has a checkered reputation—and it isn't that easy to grow.

In the 1940's and 1950's, researchers told ranchers that they could boost beef production by removing this shrub from their rangeland, enabling more grass to grow.

In the 1970's, 1980's, and 1990's, federal and western states' strip mine laws specified that disturbed lands had to be restored to their original condition, once mining was completed. This meant restoring native vegetation, including the various shrub species.

"Sagebrush species and subspecies are the most abundant native shrubs in North America. They grow on about 420,000 square miles of rangeland in 11 western states," says D. Terrance Booth, Agricultural Research Service rangeland scientist. "They are also the most widely distributed and adapted shrub species in Wyoming."

Wyoming big sagebrush, *Artemisia tridentata* spp. *Wyomingensis*, like other shrubs, adds scenic relief to vast stretches of range while providing important wildlife habitat. These plants also trap snow, holding it in place for spring melt and future plant growth.

"Today, sagebrush is recognized as a good source of winter protein for wildlife such as elk and deer, when consumed with other rangeland plants. Sage grouse, a popular game bird, depends on sagebrush and other shrubs for winter cover and food," says Booth, who is at the High Plains Grasslands Research Station in Cheyenne, Wyoming.

Ranchers also realize the importance of the shrub to rangeland ecosystems, and they value the

additional protein and carotene it provides their cattle—especially during winter or drought.

But once sagebrush is gone from the land, it's hard to restore. Both direct seeding and transplanting of nursery- or greenhouse-grown seedlings have been attempted on disturbed lands. Direct seeding often fails, and transplanting is expensive and labor intensive.

Seeding failures have been blamed on poor seed quality and a lack of understanding of seedbed requirements.

Booth recently tested a commercial de-bearder—a machine used to remove the seed from bristly seedheads—because some growers had blamed it for poor seed quality. He found it didn't reduce seed germination or other growth qualities, compared to unprocessed seed.

He and coworkers did note that heavier seed germinated best and that germination improved when seed was stored at room temperature and humidity for up to 6 months.

"Direct seeding also sometimes failed because we didn't have enough knowledge of soil management, mulching, and how other seeded species compete with each other during revegetation," says Gerald E. Schuman, an ARS soil scientist who heads the Rangeland Resources Research Unit at the station.

Schuman and colleagues found that more sagebrush came up and became established on topsoil that was salvaged and placed directly on the regraded mine spoils, as opposed to on topsoil that had been stockpiled for several years during the mining and reclamation process.

"The fresh-salvaged topsoil has better water storage characteristics and is biologically more active than stockpiled soil," says Schuman.

The scientists also found that mulching—with either straw or a grain stubble left standing—greatly enhanced sagebrush establishment, compared to nonmulched areas. But competition created by grasses plant-

ed with the sagebrush greatly reduced the sagebrush's success.

Weather, a factor no one controls, also plays a major role. In some years, spring weather is good for germination and seedling establishment; in others, it's not.

The research showed that in northeastern Wyoming, sagebrush seed will remain viable in the soil for more than a year. Plants can become established the second or third year after seeding, when

weather conditions are more favorable.—By **Dennis Senft, ARS.**

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Debearded sagebrush seeds (shown here about 10 times actual size) germinate better than nontreated seeds in disturbed lands. (K7309-2)